

Application No. 10/625,315

Specification Amendments:

Please amend the paragraph beginning on page 5, line 18 as follows:

FIG. 3 is a flow chart illustrating a method 40 of creating an anti-aliased imposter, for example, by using MIP maps. Initially, the rendering pipeline of a computer graphic system, such as a graphics accelerator adapter installed in a PC, is configured to render 3D objects directly to 2D texture maps. In addition, the texture maps to which the 3D objects are rendered may be initialized to the color black, with an alpha value of zero (0), or transparent. The process begins by internally rendering a 3D object to the 2D texture 42, such as by creating an imposter of the 3D of the object. For example, the 3D computer graphic object may be rendered to the 2D texture map at a resolution greater than the resolution of the 3D computer graphic object would conventionally be displayed. In one form the 2D texture map is rendered at 256 by 256 resolution. After the 3D object is rendered, a set of variably scaled resolution versions of the 2D texture map, or MIP maps, of the rendered 3D object are created 44 and associated with the rendered 3D object, or imposter. The MIP maps may then be blended corresponding to a desired viewing distance 46 to provide an anti-aliased imposter. This blending step may further comprise trilinear filtering, as understood in the art. After blending, the anti-aliased imposter can be rendered to a display device 48. For example, rendering the imposter to a display device may include applying the imposter as a texture to a polygon, such as a square polygon, and then rendering the polygon to the display device. In an aspect of the invention, this rendering process may be repeated on a frame by frame basis to create a new anti-aliased imposter, for example, as a viewing angle of the object changes, such as by more than a predetermined angle, or lighting on the object changes. Advantageously, if only the viewing distance of the object changes, for example, an aircraft moving directly away from an observer, then no re-rendering is required. Progressively lower resolution versions of the imposter can be substituted for the object as the object recedes from the viewer.

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Please amend the paragraph beginning on page 6, line 16 as follows:

FIG. 4 is a flow chart illustrating in more detailed the step of internally rendering as shown in the flow chart of FIG. 3. In conventional impostering techniques, the alpha channel of the imposter is squared according to the blending formula (1), resulting in erroneous alpha values for the imposter, which may be manifested as incorrect translucency rendering, such as for aircraft or vehicle windshields. Accordingly, the steps in FIG. 4 illustrate a method 50 for correcting alpha value errors in an imposter by conventionally rendering the imposter in a first rendering pass, then re-rendering the imposter with corrected alpha values (such as the alpha values corresponding to the original 3D object) in a second pass. The method 50 begins by internally rendering, in the first pass, the 3D object to the 2D texture using the color values from both the 3D object and the 2D texture, and the alpha values from the 3D object 52, according to formula (1). Maximum color values are then selected from each texel of the rendered object 54 according to the formula (2):

$$(2) \quad C = \text{MAX}(C_s, C_d);$$

where C represents the maximum color value drawn to a respective texel in the texture map, C_s represents the color value of a respective pixel of the 3D computer graphic object, C_d represents the color value of the respective texel of the 2D texture map, and the function MAX determines the maximum of C_s and C_d . For example, to implement this function, the graphics accelerator adapter may be configured so that a computer graphics hardware blending equation is set to blend according to formula (2). After selecting the maximum color values, the object is internally re-rendered, in a second pass, using the maximum color values and corrected alpha values 54_56, such as the original alpha values associated with the 3D object. For example, a computer graphics hardware

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blending equation may be set to write only alpha values to the object for this step, without replacing the color values with the maximum values.